Benchmark Results for Disk Configurations

Ilaria Pascucci[1], S. Wolf[1], J. Steinacker[1], C.P. Dullemond[2], T. Henning[1], G. Niccolini[3], P. Woitke[4], and B. Lopez[3]

(Email: pascucci@mpia.de)

[1]Max Planck Institut für Astronomie, Heidelberg, Germany
[2]Max Planck Institut für Astrophysik, Garching, Germany
[3]Observatoire de la Côte d'Azur, Nice, France
[4]Zentrum für Astronomie und Astrophysik, Technische Universität Berlin, Berlin

Interpreting the spectral energy distributions, imaging, and polarization maps of circumstellar disks requires detailed calculations of the photon transport. Such calculations can only be done by developing sophisticated radiative transfer (RT) codes that solve the RT equation numerically. Currently, various multidimensional codes implementing different methods and numerical schemes are being applied to treat the RT in circumstellar disks. Validating such codes is a prerequisite for a proper understanding of the properties and evolution of disks. Here, we present the first benchmark problems and solutions for the continuum radiative transfer in a 2D disk configuration. The reliability of three Monte-Carlo and two grid-based codes is tested by comparing their results for a set of well-defined cases which differ for optical depth and viewing angle. For all the configurations, the overall shape of the resulting temperature and spectral energy distribution is well reproduced. We provide solutions that can be used for the verification of other RT codes.